



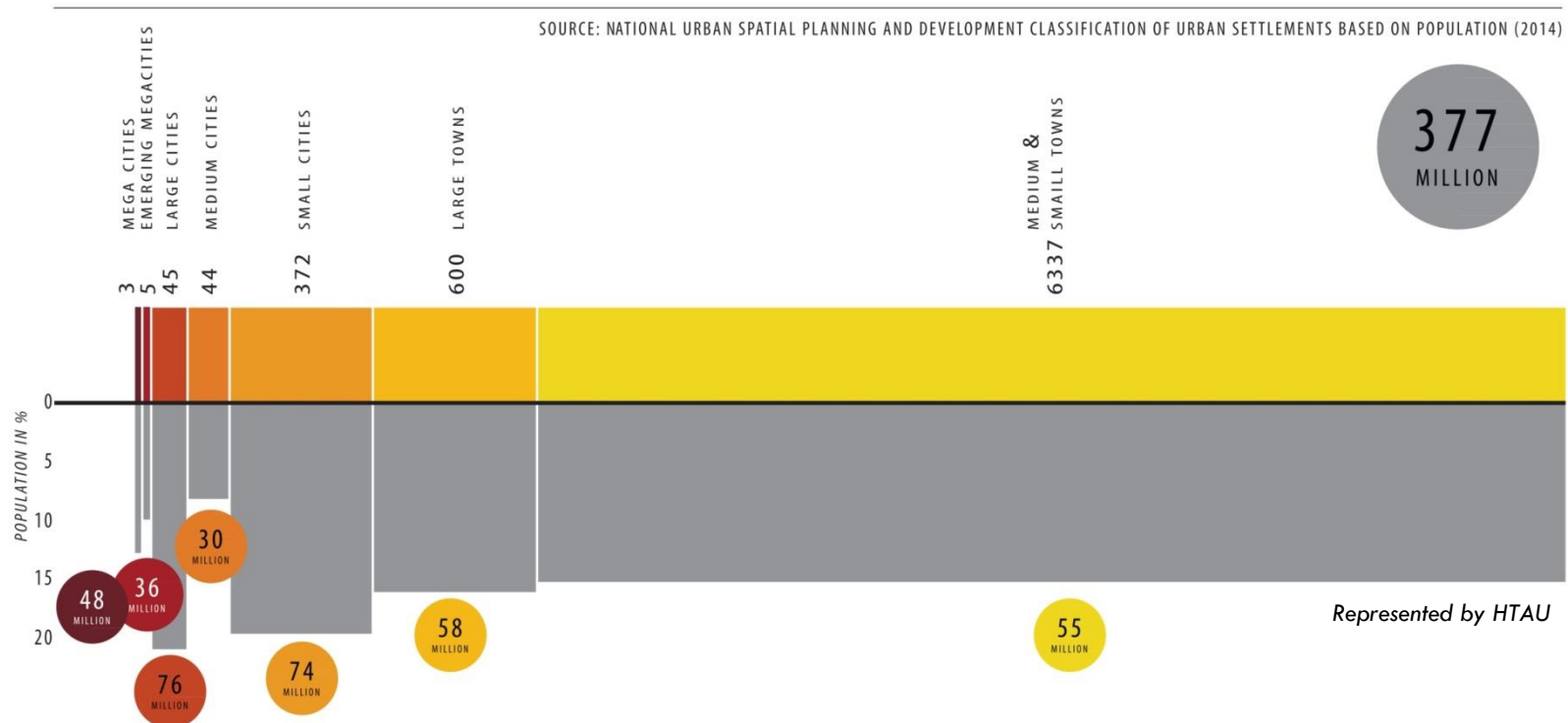
STREET DESIGN & MANAGEMENT

FOR INCREASING CYCLING AND
WALKING IN CITIES

Building Strategies for
Clean Air

WHY?

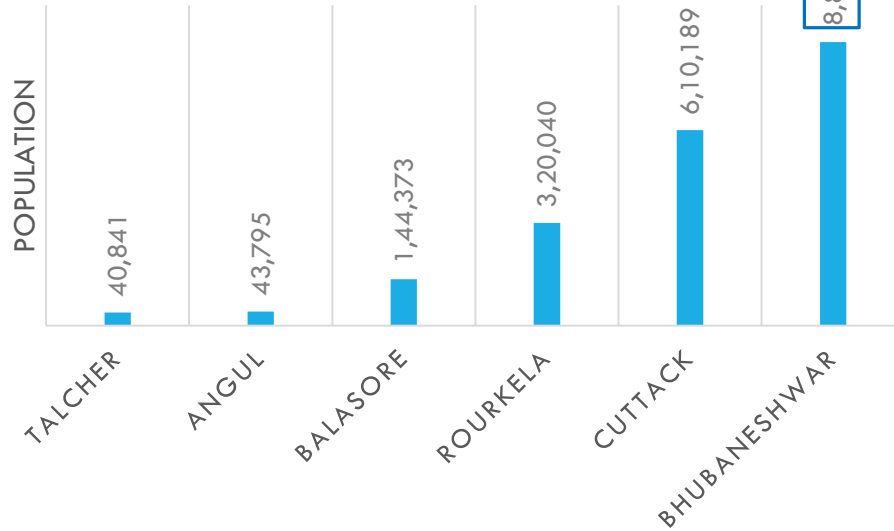
Out of India's 1.21 Billion population, 377 million are urban dwellers. By 2050, 900 million people will be living in urban centres



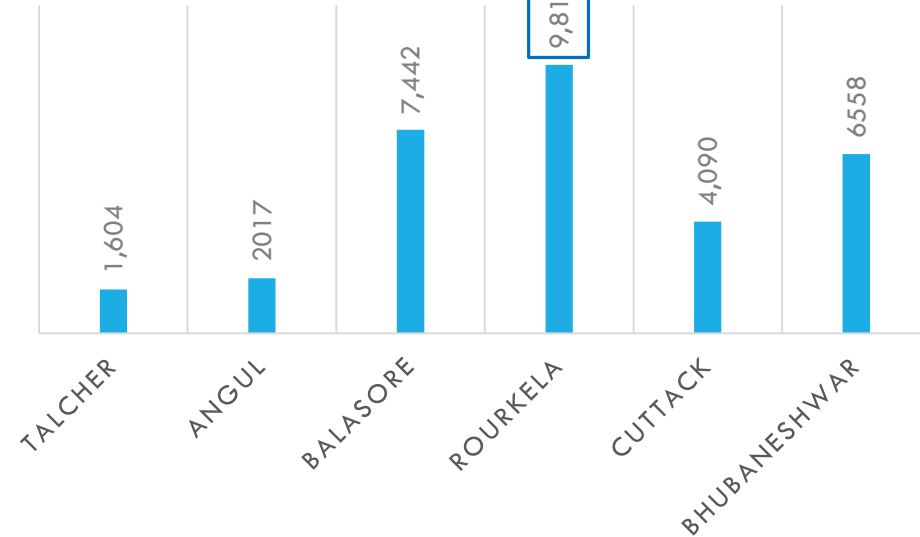
*As per 2001 census any area with a population of more than 5000 people is considered as an 'urban area'

LOOKING AT CITIES IN THE ROOM ...DIFFERENT SCALE

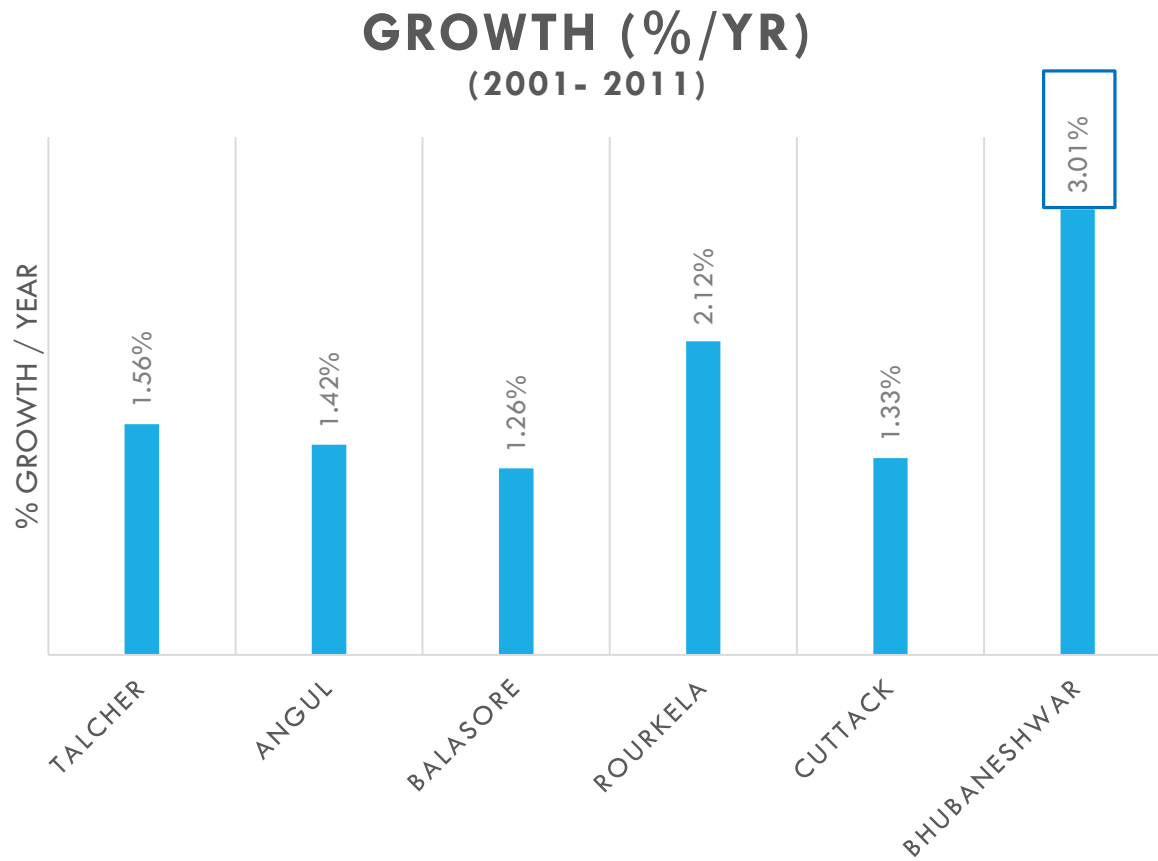
POPULATION
(2011)



POPULATION DENSITY
(PERSONS / KM²)



URBANISING NONETHELESS



BIGGEST CHALLENGE

Providing shelter, employment opportunities and basic infrastructure



And the social, environmental and economic impact of urbanisation of such magnitude on the quality of life

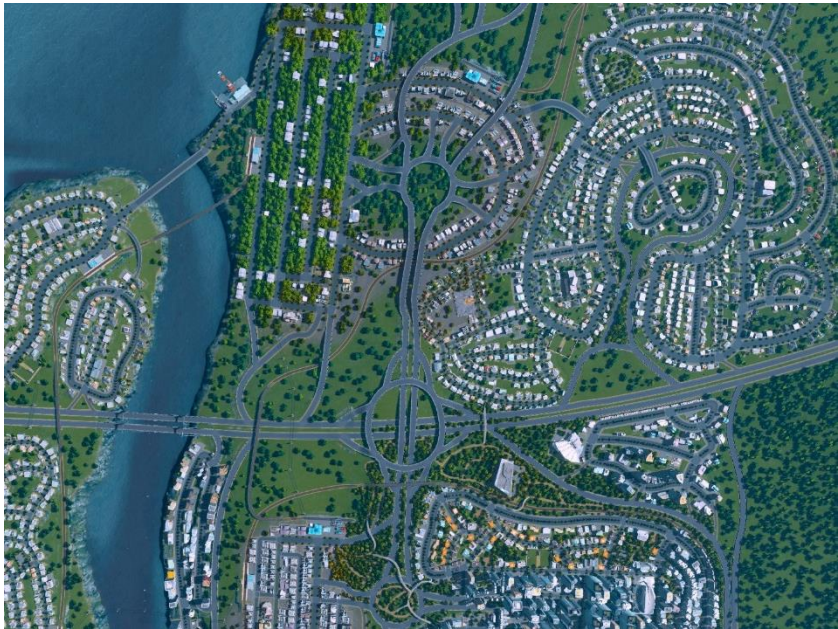
THE MANIFESTATION...CRISES



SUSTAINED DEGENERATION OF CITIES

CITIES CAN PROMOTE SUSTAINABLE LIFESTYLES...THROUGH URBAN FORM

The form of cities influences individual choices on a daily basis. Large urban blocks with limited route choices is invariably a deterrent to walking or cycling. On the other hand, walking down to a local shop or amenity using a direct route that is well-designed and therefore comfortable, active and safe can provide a convenient alternative.





SO, WHAT ARE THE BARRIERS?

LACK OF STREET
PLANNING AND DESIGN

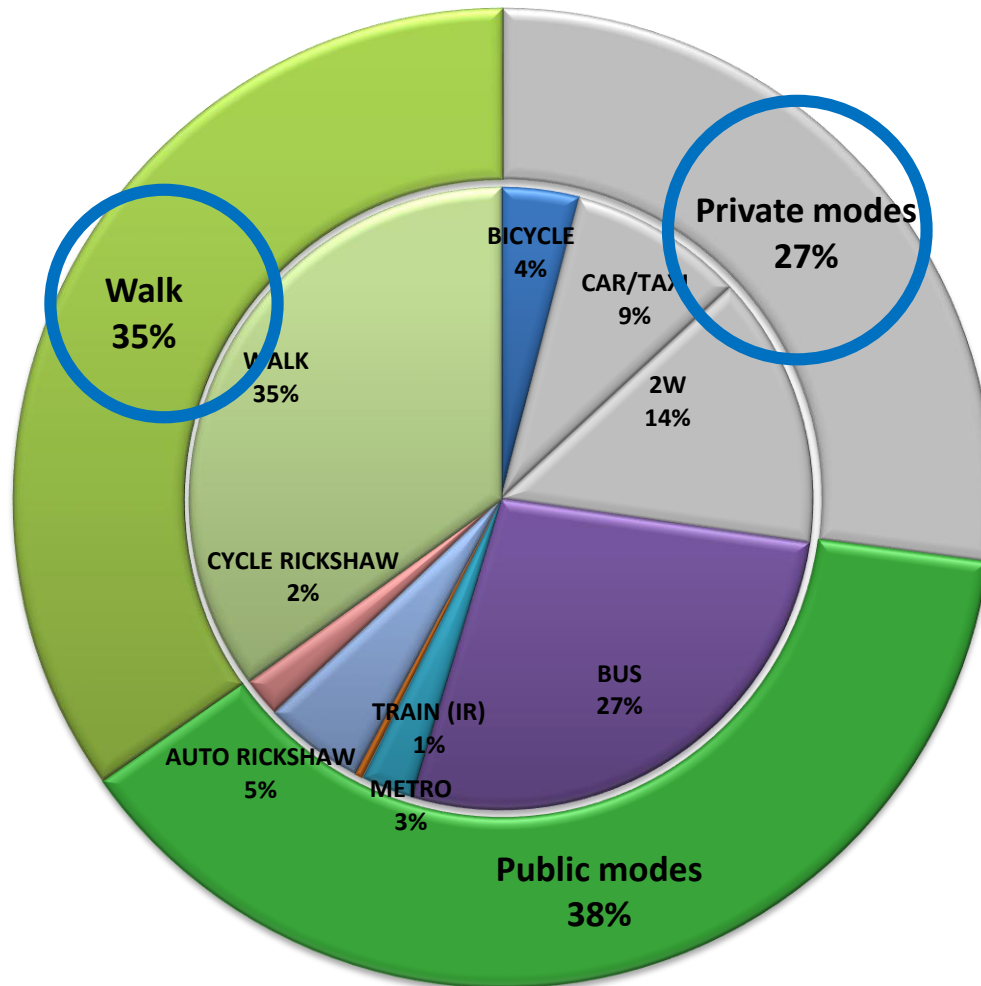
MISMATCH B/W MODAL SHARE AND INFRASTRUCTURE PROVISION



**Inequitable distribution
of road space -
Transportation
Infrastructure still being
designed only for cars**

**About 15% road users
(cars) take up 80% of
road space**

DELHI'S MODAL SHARE



Only **27%** of the city's trips are based on private vehicles. Yet almost all infrastructure investments in the city are made for this **MINORITY!**

OUT OF SCALE INFRASTRUCTURE



**Inequitable
distribution of road
space -
Transportation
Infrastructure still
being designed only
for cars**

**Safety of humans
and cyclists is at risk**

NON-SIGNALIZED HIGH SPEED CORRIDORS



Increased fatality for pedestrians and cyclists
Average off peak speed > 80km/hr

OUR STREETS ARE KILLERS



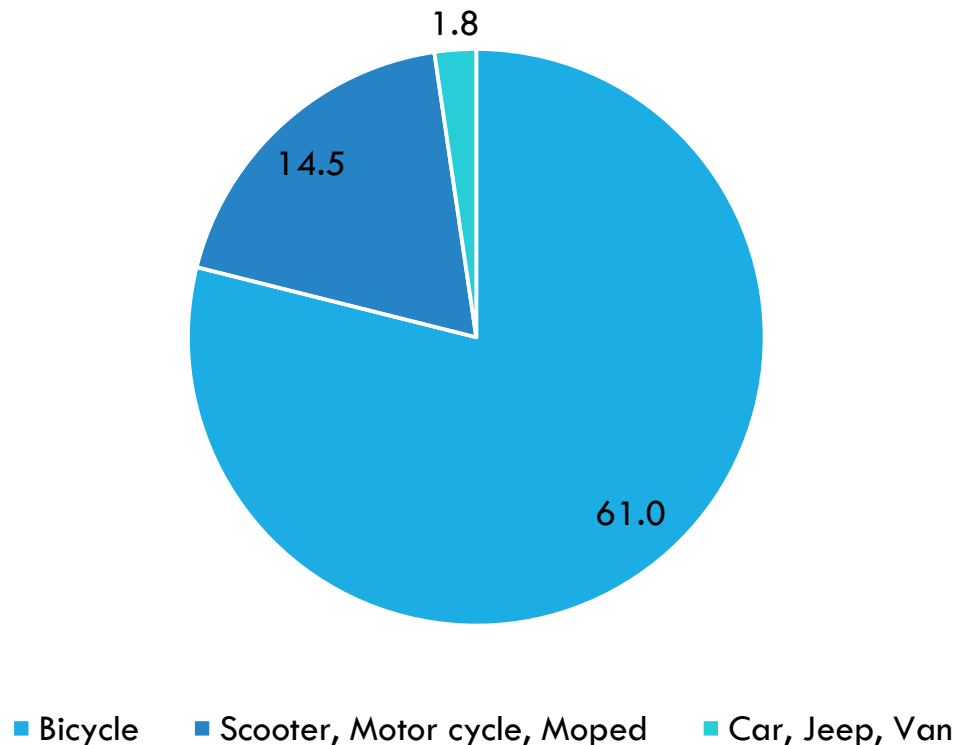
According to the Union Ministry of Road Transport and Highways, around 4,60,000 road accidents were reported in 2017 in India, claiming 1,47,913 lives and causing injuries to 4,70,975 persons. Our roads kill equivalent to 46% of Mautius' population every year.

THE VULNERABLE & THE MOST EXPOSED



ODISHA LIKES ITS CYCLES

**% of Households in Odisha having Bicycles,
2-wheelers & 4-wheelers**



ARE WE PAYING ATTENTION THOUGH?



MOBILITY IS **SEVERELY HAMPERED** ACROSS ALL TIER I, II, III CITIES



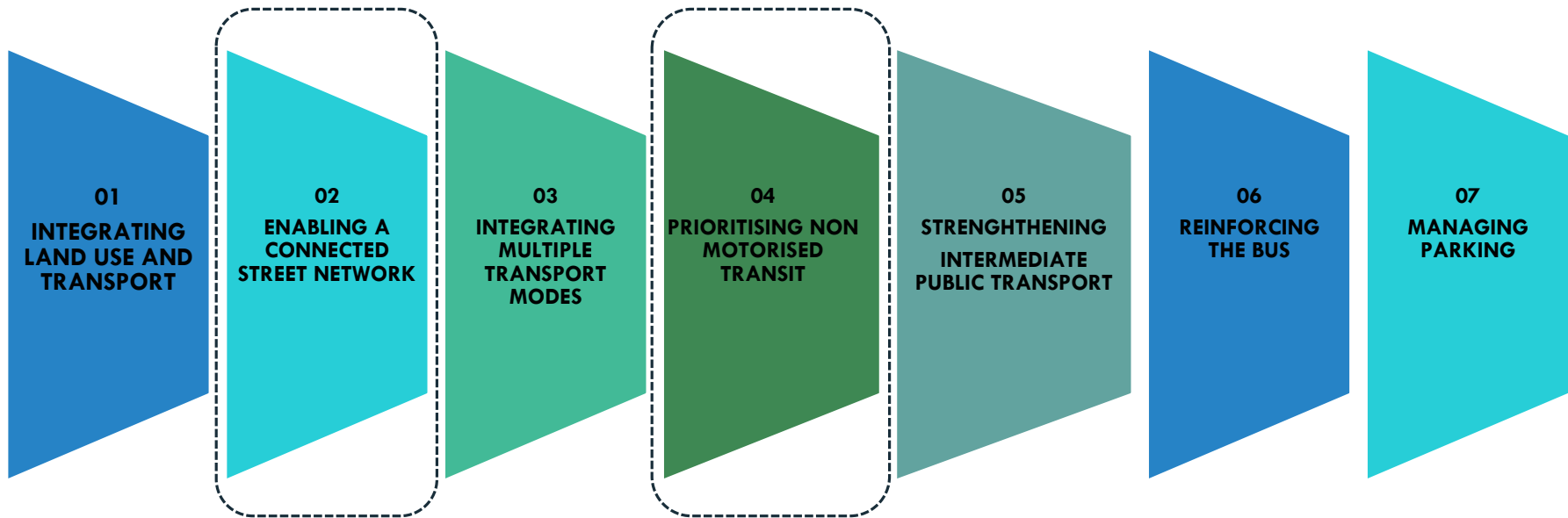
A recent World Bank Report on India's urban mobility congestion states that

"most Indian cities are slow not due to high traffic congestion, but due to low uncongested mobility..."

i.e. there being hardly any gap between the highest speed and slowest speed during the entire day."

Unplanned, Disorganised &

THE PRINCIPLES



To enable complete ease of access can induce people to walk, cycle and use public transport as a priority over personalized modes of transport.

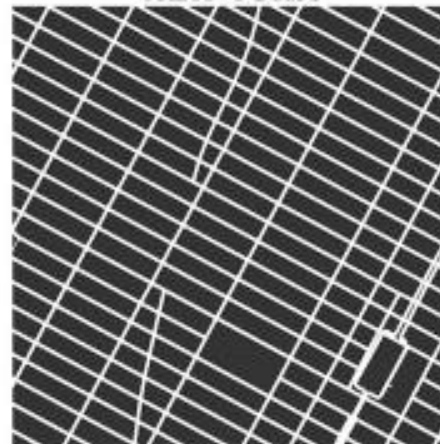
PORTLAND



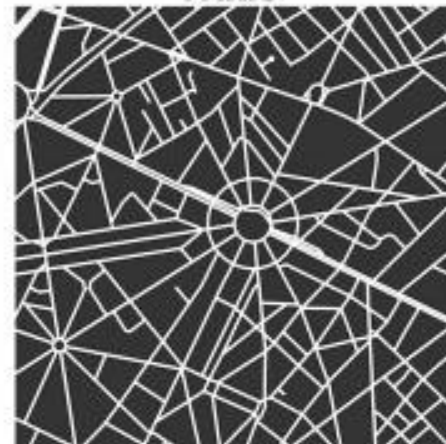
SAN FRANCISCO



NEW YORK



PARIS



IRVINE



ROME



TUNIS



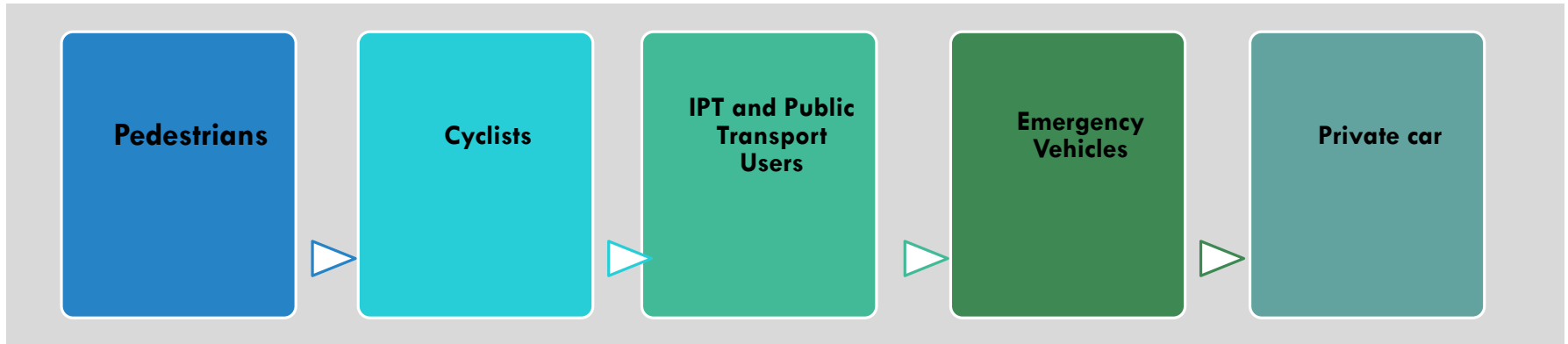
ATLANTA



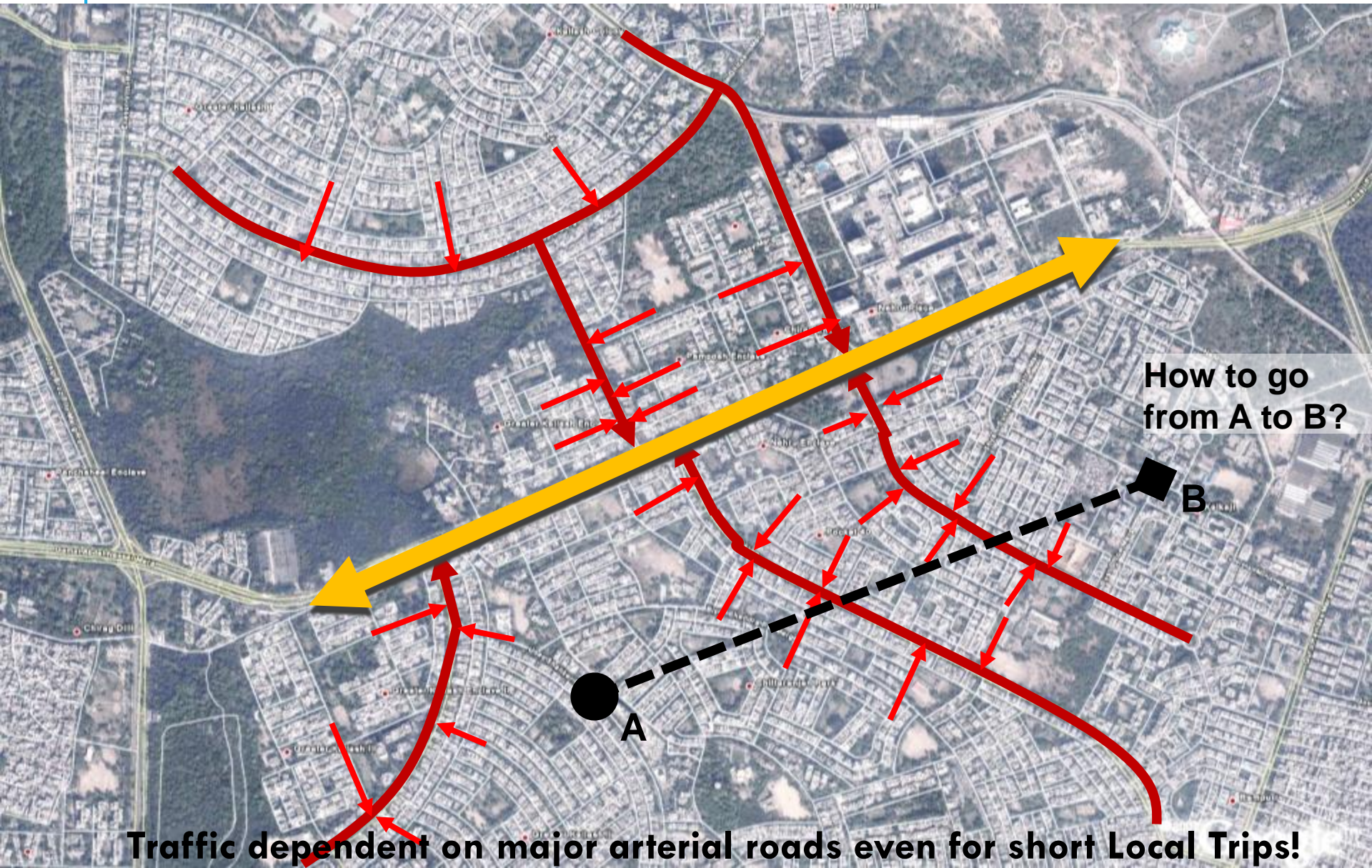
**ENABLING A CONNECTED
NETWORK OF STREETS**

NETWORK PLANNING

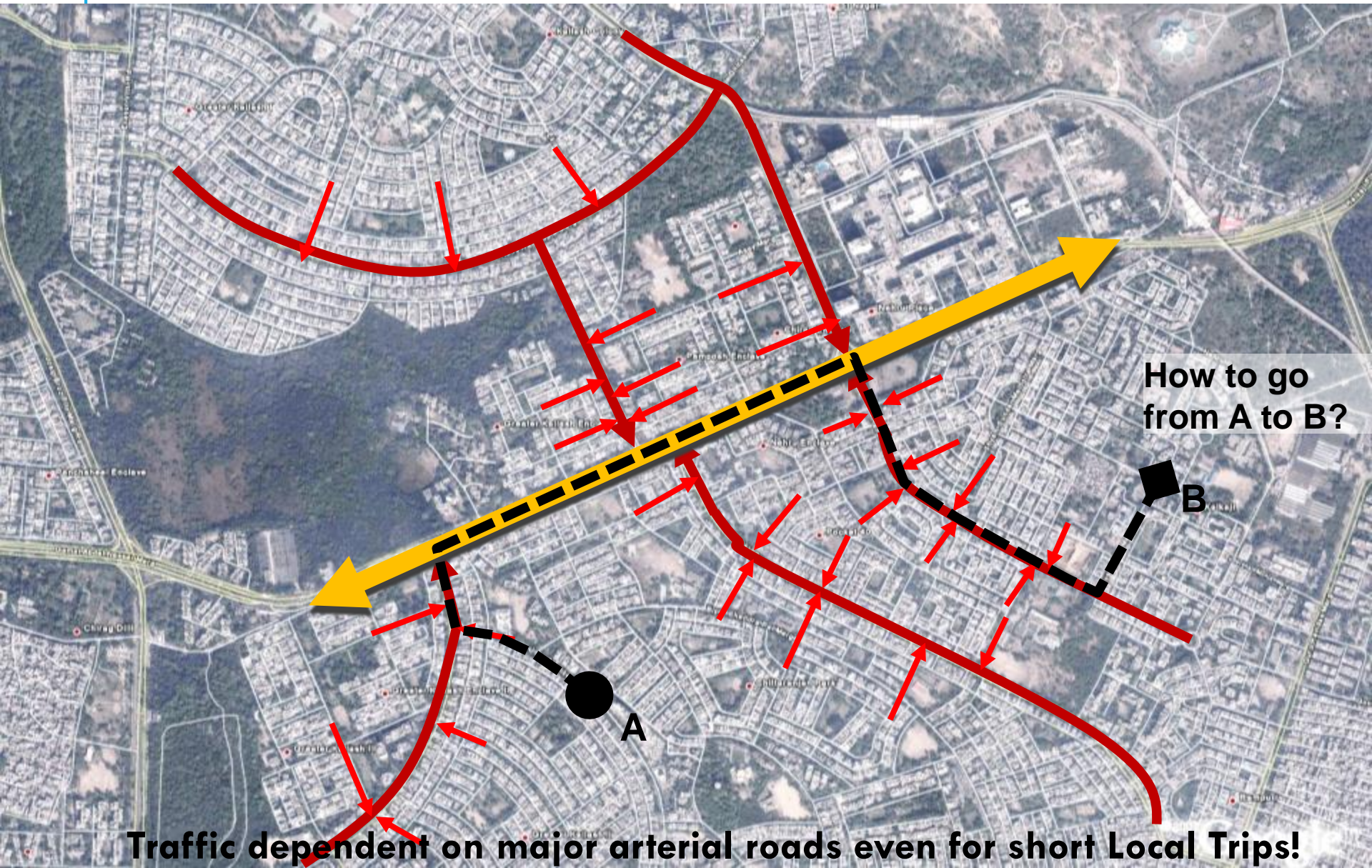
CHANGING PRIORITIES



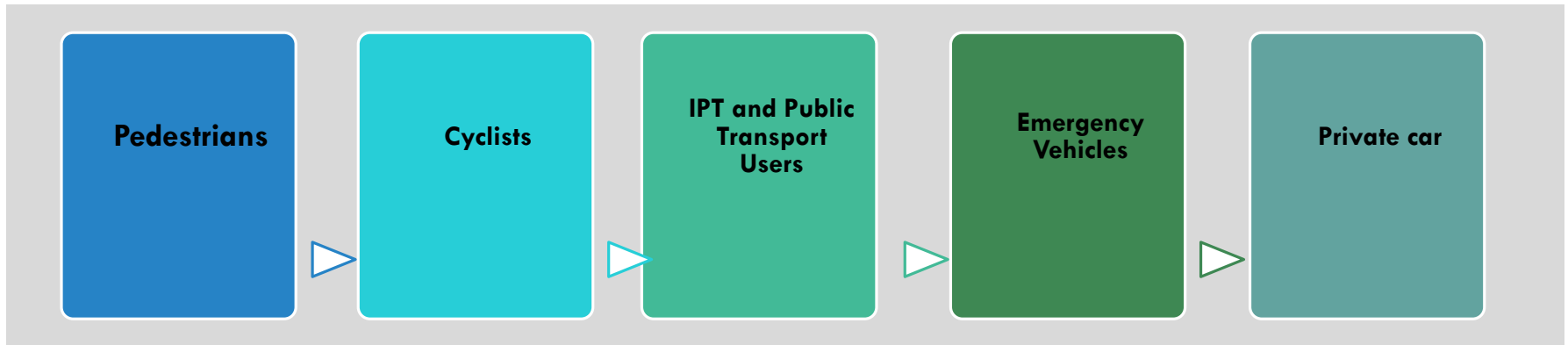
MULTIPLE DIRECT ROUTES ARE ESSENTIAL



MULTIPLE DIRECT ROUTES ARE ESSENTIAL

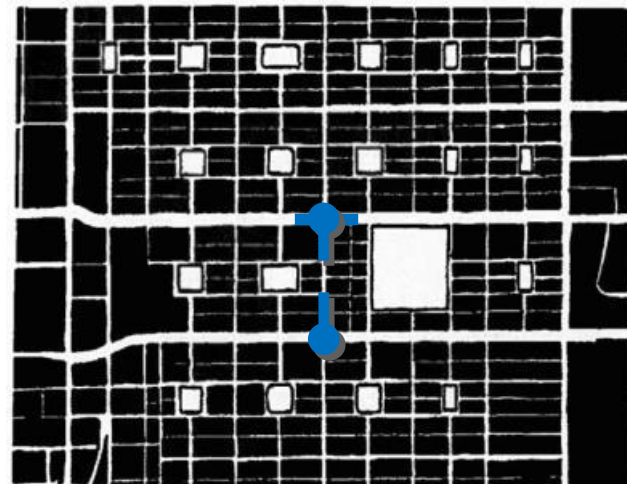


CHANGING PRIORITIES



Typical Suburban Development Image Courtesy of Allan B. Jacobs, Great Streets

15-minute walk



Network of Connected Streets Image Courtesy of Allan B. Jacobs, Great Streets

5-minute walk

ENHANCE CITY NETWORKS: THE PRIORITIES

Augmenting road network to distribute high traffic volumes over multiple roads, particularly secondary and tertiary. This must be carried out without any negative impact to natural features or drains

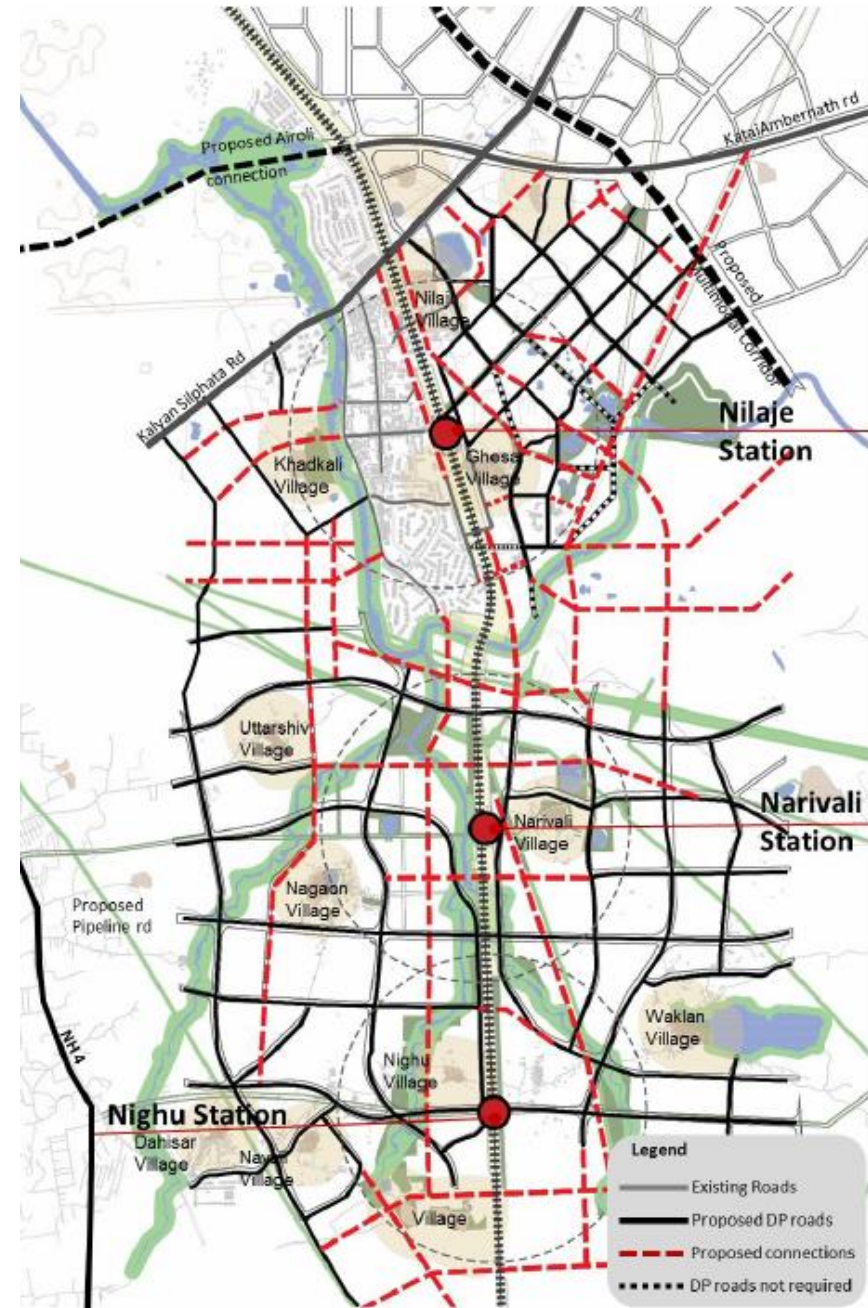
For this, undertaking Network Planning for each Zone to identify road network augmentation projects to achieve a finer network to deliver a vehicular route network of approximately 300M and a NMT network not greater than 100M.

Incentivizing retrofitting of existing developed areas to achieve a vehicular route network of 300M and a NMT network not greater than 100M as far as possible by providing additional FAR per unit of land surrendered for new road networks as per the Network Plan.

Designing intersections to reduce delays and increase safety for all road users, with a priority to non-motorized and public transport modes.

1. PREPARE AND IMPLEMENT A NETWORK PLAN TO AUGMENT EXISTING NETWORKS

1. Review the alignment and ROWs of proposed roads in City Plans based on ground realities.
2. Reduce ROWs of proposed Roads, as maybe required, if network augmentation is achieved through a greater number of roads with smaller ROWs.
3. Undertake a Traffic Impact Assessment (TIA) for the entire Network.
4. Identify potential Parking Management Districts
5. Identify priorities to ensure maximum benefit to maximum number of people.
6. To streamline and quicken the planning and approvals process, the Network Plan and TIA for the same may be approved in one go.
7. Use GIS database to monitor the road length and road space so that there can be optimization and there is a cap on future expansion of road space as a percentage of the landuse
8. In addition, prepare a dynamic city-wide integrated Transport – Land use Model to aid the planning process and assess the network needs at the city level.



2. RETROFIT ROADS / STREETS TO ENSURE EQUITABLE DISTRIBUTION OF ROAD SPACE FOR ALL MODES.

1. *Retrofitting Highways within city limits to function as arterial roads to ensure the corridor is unconditionally safe for all modes and users. On priority, retrofitting roads identified as accident hotspots in the city.*
2. *Retrofitting all roads with ROW > 18M and all junctions to reduce delays and increase safety for all road users*
3. *In addition, providing dedicated stops / stands in addition to other drop-off / pick-up bays within the Multi-Functional Zones within ROWs designed to provide for IPT.*
4. *On priority, retrofitting all roads including junctions along Mass Transit Networks. Project identification / prioritisation could be guided by the Network Plans*



PROVIDE PLEASANT WALKING & CYCLING EXPERIENCES

STREET PLANNING AND
DESIGN

WALKING & CYCLING ENVIRONMENTS



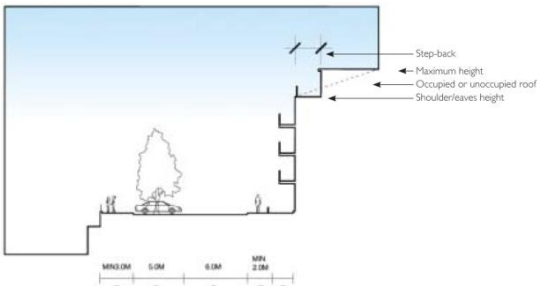
CODING FOR STREETS

Key

- Coding Area (see Code G02)
- Conservation Area Boundary (see Section 4)
- Character Area Boundary (G03)
- Road Centre Line (see Section 3.3)
- Active Occupied Frontage (F01, B,01)
- Semi-Active Occupied Frontage (F02)
- Frontage Enclosure (F03)
- Set-Back Frontage (F02, F04)
- Frontage or Possible Mews access (S09.2a)
- Mews Frontage Reference Line (S09.2a)
- Variable Building Line 100-75% (B,02)
- Variable Building Line 74-50% (B,03)
- Variable Building Line 49-30% (B,04)
- Variable Building Zone within Mews (B,05, S09.2a)
- Plot Series (P01)
- Vehicular/Cycle Zone (G04.1)
- Shared Zone (G04.1)
- Pedestrian Zone (G04.1)
- Area of Co-ordinated Public Realm (P01)
- Possible extension of Co-ordinated Public Realm (P01)
- Existing buildings shown as retained in Masterplan
- River and Marina
- River bank
- Landmark (B01)
- Marker Building (B02)
- Corner Building (B03)
- Gateway Feature (B04)
- 1:30 --- Approximate Street Gradient
- (3) --- Minimum Building Storey Number (P02)

A larger scale drawing (1:1000) is included in Appendix A. An electronic version of the Regulating Plan at a resolution equivalent to 1:500 is also available on CD by request from the Council.





S.04 RIVER'S EDGE

- General character**
Active promenade, tree lined, 3-5 storey continuous frontage, regular, consistent plot size, consistent building type and style.
- Use/mix/adaptability**
Residential development with ground floors designed as adaptable/ flexible space (Use Classes C3; A1, A3, A4 around junctions of Burrell Street and Water Lane).

S.04.1 RIVER'S EDGE • PLOT SERIES

Plot Series	Riverside Character Area Code
Priority relative to street	Active frontage must be oriented toward the street
Sub-series	
Series type (regular/mixed)	regular
Plot width at frontage (dimension range)	6m-12m; exceptionally, larger width, in increments of 5m, with vertical articulation of module visible in the facade
Points of access (type and frequency)	
Pedestrian	Minimum every 12m
Vehicular	None
Allowable plot types	Attached

S.04.2 RIVER'S EDGE • PLAN

Public highway	Riverside Character Area Code
Attribute	
Carriage width	6.0m
Footpath width	Min 2.0m, Min 3.0m along riverfront
Design Speed	20 mph
Traffic Calming	Carriageway narrowing
Junction visibility splays	Minor road distance - 2.4m Major road distance - 33.0m
Junction radii	Min. 4.0m
Vehicle type to be accommodated	Cars, small service vehicles, fire appliances, cycles
On-street parking	Perpendicular - 5.0m x 2.5m
Direct access to plots	No
Street trees	8.0 - 12.0m spacing between trees (adjust to accommodate parking areas)

S.04.3 RIVER'S EDGE • SECTION

Street section	Riverside Character Area Code
Attribute	
Shoulder/leaves height	3-5 storey
Storey height	Floor to ceiling heights on the ground floor must be a minimum of 2.7m to allow for flexibility of use and adaptability
Maximum height of roof occupied or unoccupied	3m above shoulder/leaves height
Step-back	2.5m maximum
Balconies	1.5m maximum
Vertical position of access	Level
Vertical mix of uses	Residential on ground floor, retail on ground floor around junctions of Burrell Street & Water Lane, residential above ground floor

1 Riverside walk is intended as a continuous public right of way built to adoptable standard that did form part of the Trans Pennine Way.

M.04.1 RIVER'S EDGE • MATERIALS

Materials	Riverside Character Area Code
Attribute	
Footway	Yorkstone flag, colour as specified in colour palette (see section 3.12)
Parking	As carriageway
Shared surface	N/A
Kerb	Yorkstone kerb, conservation kerb, colour as specified in colour palette (see section 3.12)
Carriageway	Yorkstone setts, colour as specified in colour palette (see section 3.12)
Furniture	contemporary, stainless steel, timber, glass

P.04.1 RIVER'S EDGE • PLOT

Plots	Riverside Character Area Code
Attribute	
Front	
Boundary	
Type	Delimitation in paving pattern
Height	N/A
Front area/ garden	
With vertical boundary	N/A
Without vertical boundary	Paved
Side/back	
Boundary with public highway	
Type	Building (See Building Line Code 06)
Height	N/A
Boundary with shared private open space	
Type	Brick/masonry wall, timber fence
Height	1800mm-2100mm, top 600mm may allow limited view through
Boundary shared with adjacent plot	
Type	Brick/masonry wall, timber fence
Height	1800mm-2100mm
Side/Back area	
Parking, position	N/A
Parking, access	N/A
Parking, integral	N/A



Examples of materials and street furniture

1. Yorkstone flag
2. Tegula setts
3. Yorkstone setts
4. Indicative use of timber and steel
5. Indicative bollard
6. Indicative railing

Allowable plot types



- **Commercial Streets are designed with ZERO Setbacks**



WITH ZERO SETBACKS

= SAFE STREETS





= UNSAFE STREET



CODING FOR STREETS



Westgate/Sheffield Road/Corporation Street



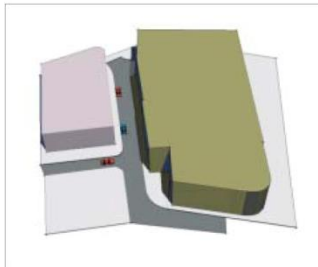
River's Edge



Wilfred Street / Oil Mill Fold



Main Street



Domine Lane



Minor Lane



New Bridge Street



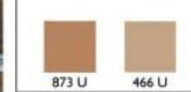
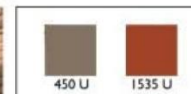
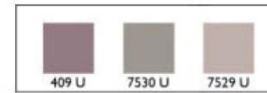
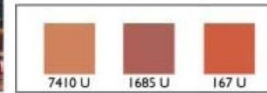
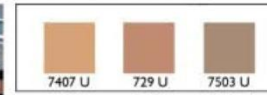
Burrell Street / Water Lane



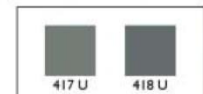
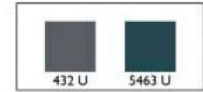
Mews



elevations



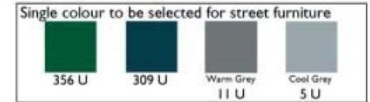
roofs



floorscape



Paving schemes to use local aggregates



Note: All colour references are PANTONE® solid uncoated

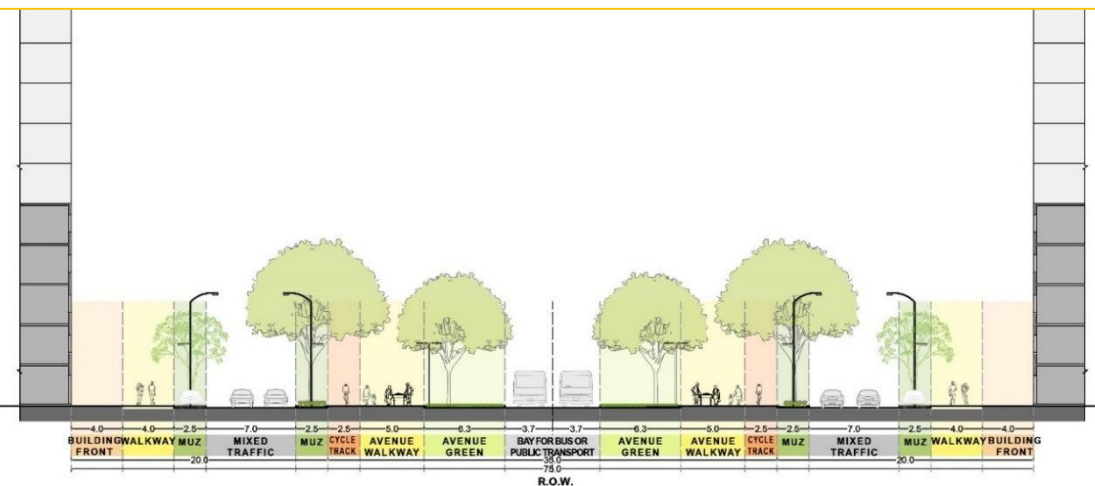
accent colours



ENHANCE CITY CHARACTER: THROUGH STREETS

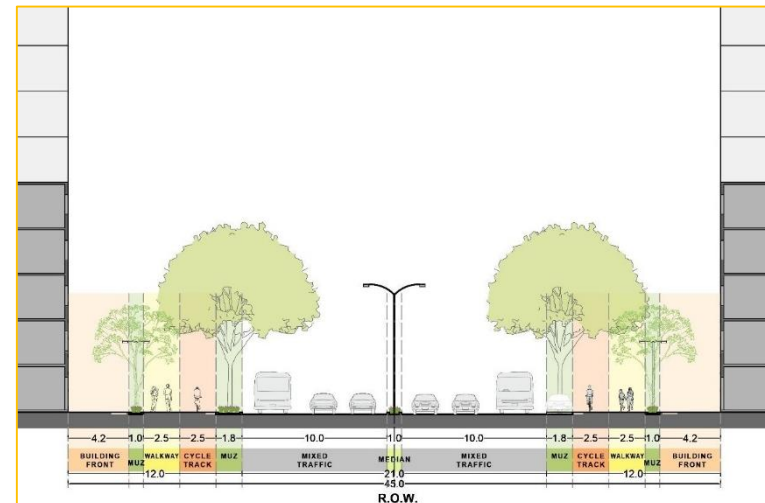
ST 01: CEREMONIAL ACCESS

ROW	7.5 M
ADJACENT DEVELOPMENT	COMMERCIAL
MRTS / BRTS	YES = BAY PROVIDED FOR PUBLIC TRANSPORT
CARRIAGEWAY	7 M, 2 LANE DUAL CARRIAGEWAY
CENTRAL MEDIAN	YES
MULTI-UTILITY ZONE	SIDE 1 = 2.5 M & 2.5 M; SIDE 2 = 2.5 M & 2.5 M
CYCLE TRACK	SIDE 1 = 2.5 M; SIDE 2 = 2.5 M
FOOTPATH	EDGE 1 = 4 M; EDGE 2 = 4 M
PARKING	YES = PARALLEL
AVENUE PLANTING	YES



ST 02: HIGH STREET ACCESS

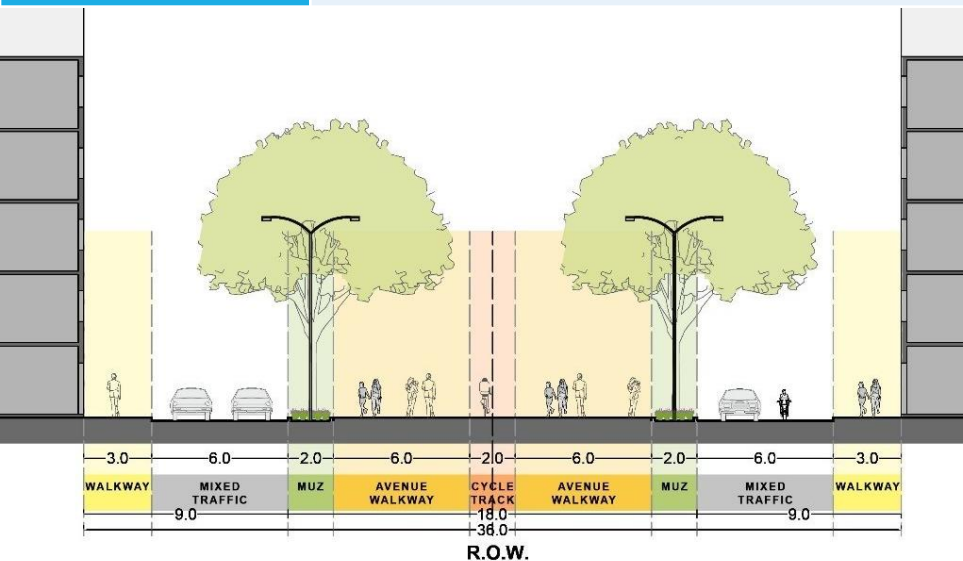
ROW	45 M
ADJACENT DEVELOPMENT	COMMERCIAL
MRTS / BRTS	NO
CARRIAGEWAY	10 M, 3 LANE DUAL CARRIAGEWAY
CENTRAL MEDIAN	YES
MULTI-UTILITY ZONE	SIDE 1 = 1.8 M & 1M; SIDE 2 = 1.8 M & 1M
CYCLE TRACK	SIDE 1 = 2.5 M; SIDE 2 = 2.5 M
FOOTPATH	EDGE 1 = 2.5 M; EDGE 2 = 2.5 M
PARKING	YES = PARALLEL
AVENUE PLANTING	NO



ENHANCE CITY CHARACTER: THROUGH STREETS

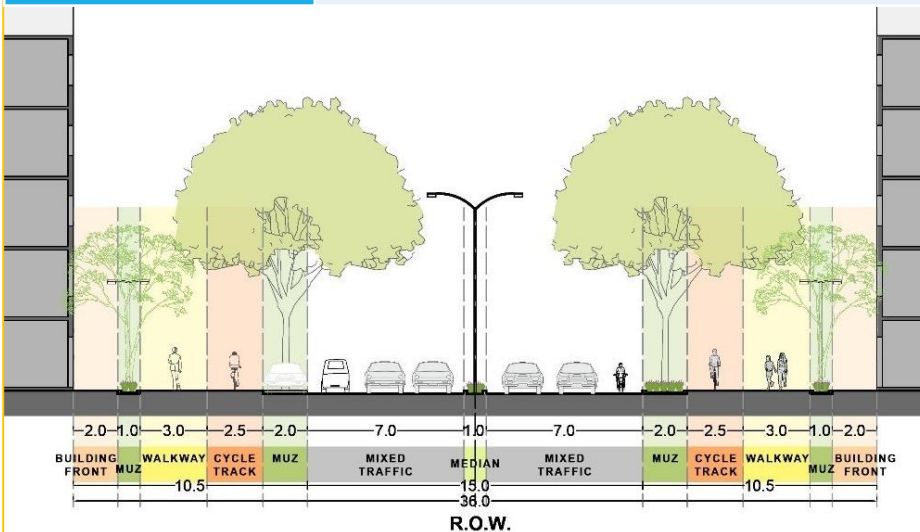
ST 03: GREEN AVENUE ACCESS

ROW	36 M
ADJACENT DEVELOPMENT	COMMERCIAL
MRTS / BRTS	NO
CARRIAGEWAY	6 M, 2 LANE DUAL CARRIAGEWAY
CENTRAL MEDIAN	YES
MULTI-UTILITY ZONE	SIDE 1 = 2 M; SIDE 2 = 2 M
CYCLE TRACK	CENTRE = 2 M
FOOTPATH	EDGE 1 = 3 M; EDGE 2 = 3 M
PARKING	YES = PARALLEL
AVENUE PLANTING	YES



ST 05: COMMERCIAL ACCESS

ROW	36 M
ADJACENT DEVELOPMENT	COMMERCIAL
MRTS / BRTS	NO
CARRIAGEWAY	7 M, 3 LANE DUAL CARRIAGEWAY
CENTRAL MEDIAN	YES
MULTI-UTILITY ZONE	SIDE 1 = 2 M; SIDE 2 = 2 M
CYCLE TRACK	SIDE 1 = 2.5 M; SIDE 2 = 2.5 M
FOOTPATH	EDGE 1 = 3.0 M; EDGE 2 = 3.0 M
PARKING	YES = PARALLEL
AVENUE PLANTING	YES



Street Design Guidelines

“...for Equitable Distribution of Road Space” - NUTP



© UTTIPEC, Delhi Development Authority, New Delhi
Guidelines Adopted: Nov 2009. Revision 1: Nov 2010

AJMAL KHAN ROAD, DELHI



Air pollution down by a fourth in car-free zone of Karol Bagh

NUMBER OF PEOPLE ON FOOT UP 2.7 TIMES

1 Avg roadside PM2.5 concentration
(micrograms per cubic metre)

47

Ajmal Khan Road

64.5

Arya Samaj Road

35%
HIGHER

2 Noise

Handheld devices showed noise levels were lower in the car-free zone (no concrete figures given)

3 Mobility

No. of people who walked in both directions per 5 minutes at 5pm

155

ARYA SAMAJ ROAD

375

AJMAL KHAN ROAD





“Well-designed places where people want to live, spend time and work can generate financial value.”

- Urban Design Compendium II - Delivering Quality Places (UDC2),

A best practice document published by the Homes and Community Agency, Govt. of UK.